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IS : 2562 - 1979

(Reaffirmed 2005)

Indian Standard
SPECIFICATION FOR
RUBBER-BASED ADHESIVES FOR
TYRES AND TUBES, CURING
(*First Revision*)

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SPECIFICATION FOR RUBBER-BASED ADHESIVES FOR TYRES AND TUBES, CURING (*First Revision*)

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Indian Standard
SPECIFICATION FOR
RUBBER-BASED ADHESIVES FOR
TYRES AND TUBES, CURING
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 July 1979, after the draft finalized by the Adhesives Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was published in 1963. In this revision the requirement for adhesion strength and its method of test have been modified, while the keeping quality has been expressed as shelf life.

0.3 This standard covers rubber-based adhesives that develop adhesion on curing under conditions of temperature and pressure as specified by the manufacturer. These adhesives are used in the tyre and tube industry for sticking cured rubber to cured or uncured rubber or to fabric, or fabric to fabric.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for rubber-based adhesives for tyres and tubes, curing.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions and those given in IS:3434-1965† shall apply.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms for adhesives and pressure sensitive adhesive tapes.

2.1 Adhesion Strength — The minimum force required to cause failure of the adhesive bond.

2.2 Open Assembly Time — The time elapsing between the application of adhesive and the assembly of the components of the joint.

3. REQUIREMENTS

3.1 Description — The material shall be manufactured from rubber or reclaimed rubber, compounding ingredients, resins and appropriate solvents.

3.2 Open Assembly Time — A film of adhesive shall have dry tack to effect assembly in not more than 20 minutes at a temperature of $27 \pm 2^{\circ}\text{C}$ and 65 ± 5 percent relative humidity.

3.3 Consistency — The material shall be supplied in such a condition that it is suitable for brush application at a temperature of $27 \pm 2^{\circ}\text{C}$ and 65 ± 5 percent relative humidity.

3.4 Adhesion Strength — When tested as prescribed in Appendix A, adhesion strength of the bonded specimen shall be not less than 10 kg/cm.

3.5 Adhesion Strength After Heat Ageing — When tested as prescribed in Appendix B, the decrease in adhesion strength shall not exceed 30 percent of the value obtained for unaged specimen.

3.6 Shelf Life — The material, when stored in original unopened containers at temperatures up to 30°C , shall satisfy the requirements specified in 3.1 to 3.5 for a minimum period of 6 months from the date of manufacture.

4. PACKING AND MARKING

4.1 Packing — The material shall be packed in air-tight containers.

4.2 Marking — The container shall be marked with the following information:

- a) Name of the material;
- b) Manufacturer's name and recognized trade-mark, if any;
- c) Batch number;
- d) Date of manufacture;
- e) Directions for storage and use, especially with respect to flammability and toxicity;
- f) Shelf life of the material; and
- g) Net volume of contents.

4.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE—The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Preparation of Test Samples — Representative test samples of the material shall be prepared as prescribed in Appendix C.

5.2 Number of Tests — Tests for the determination of all the requirements given under 3 shall be performed on each of the individual samples separately.

5.3 Criteria for Conformity — A lot shall be declared as conforming to the requirements of this specification, if the different test results as obtained under 5.2 meet the corresponding requirements given in the standard.

APPENDIX A

(Clause 3.4)

DETERMINATION OF ADHESION STRENGTH

A-1. OUTLINE OF THE METHOD

A-1.1 Test specimens are prepared by bonding strips of cured rubber to uncured rubber, with the adhesive using a roller weighing 10 kg and curing under conditions of temperature and pressure as specified by the manufacturer. Adhesion strength shall then be measured by the stripping force required to cause separation of adhering surfaces at a specified rate of separation at an angle of 180°.

A-2. APPARATUS

A-2.1 Tensile Testing Machine — A standard tensile testing machine shall be used. The grips shall be so designed as to grip the ends of the specimen firmly between knurled, straight vertical surfaces. The rate of separation of grips shall be 50 mm per minute. The pendulum shall be free to move forward and backward, that is, the pawls shall be disengaged.

A-3. NUMBER OF TEST SPECIMENS

A-3.1 Six test specimens shall be tested for each assembly for each test.

A-4. PREPARATION OF TEST SPECIMENS

A-4.1 Buff carefully and evenly one face of a 4.0 mm thick carbon black loaded vulcanized natural rubber slab of size 25×150 mm, with a medium emery paper [see IS:715 (Part I)-1976*] and then clean the buffed surface with carbon tetrachloride or non-leaded petrol (usual size of rubber compound slab is 7.5×22.5 cm approximately). Prepare a 4.0 mm thick calendered unvulcanized sheet of size identical to that of the vulcanized sheet. Apply three coats of solution to be tested on 100 mm length of buffed face of the vulcanized slab. Apply solution similarly to the unvulcanized slab also. A minimum drying period of 15 minutes should be allowed for each coat of solution after application on both the surfaces. Assemble the two slabs, the solutioned faces being adjacent, with an insertion of a strip of cellulose film about 5 cm wide at one end to a depth of approximately 3 cm so as to leave tabs for inserting in tensile tester.

A-4.2 Place the assembled slab in a suitable two-piece mould and vulcanize in a daylight press for 35 minutes at 144°C . Alternatively, vulcanize in an autoclave (use hydraulic pressure 2800 kPa) taking 15 minutes to raise the temperature to 144°C followed by a steady period of 30 minutes. Then take out the composite slab.

A-5. CONDITIONING

A-5.1 Condition the bonded specimen for 24 hours at a temperature of $27 \pm 2^{\circ}\text{C}$ and relative humidity 65 ± 5 percent.

A-6. PROCEDURE

A-6.1 Fix the free ends of the test specimen in the two jaws of tensile testing machine. Start the machine and record the load required to separate the joint.

A-7. CALCULATION AND REPORT

A-7.1 Calculate the load required to cause separation in terms of kg/cm width. If the variation in any two of the six results exceeds 10 percent of the test results, the results shall be discarded and a further set of six test specimens shall be tested. The mean of the six values obtained shall be reported as adhesion strength.

*Specification for coated abrasive: Part I General application (*third revision*).

APPENDIX B

(Clause 3.5)

DETERMINATION OF ADHESION STRENGTH AFTER HEAT AGEING

B-1. PROCEDURE

B-1.1 Prepare six specimens for each assembly as prescribed in A-4.1. Keep these specimens in an air oven maintained at a temperature of $70 \pm 2^\circ\text{C}$ for 168 hours. Cool for one hour at a temperature of $27 \pm 2^\circ\text{C}$ and 65 ± 5 percent relative humidity and test for adhesion strength as prescribed in Appendix A.

B-2. CALCULATION AND REPORT

B-2.1 Calculate the load required to cause separation in terms of kg/cm width. If the variation in any two of the six results exceeds 10 percent of the test results the results shall be discarded and a further set of six test specimens shall be tested. The mean of the six values obtained shall be reported as adhesion strength.

APPENDIX C

(Clause 5.1)

SAMPLING OF RUBBER-BASED ADHESIVES FOR TYRES AND TUBES, CURING

C-1. GENERAL REQUIREMENTS OF SAMPLING

C-1.1 Samples shall not be taken in an exposed place.

C-1.2 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

C-1.3 Samples shall be placed in suitable, clean, dry and air-tight glass containers.

C-1.4 Each sample container after filling shall be sealed air-tight and marked with full identification particulars, such as sample number, the date of sampling, the batch of manufacture of material and other important particulars of the consignment.

C-2. SCALE OF SAMPLING

C-2.1 Lot — In a single consignment, all the containers of the same size and drawn from the same batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture or of different sizes of containers, then the containers belonging to the same batch and of the same size shall be grouped together and each such group shall constitute a separate lot.

C-2.1.1 Samples shall be tested for each lot for ascertaining the conformity of the material to the requirements of the specification.

C-2.2 The number of containers (n) to be selected from a lot shall depend on the size of the lot (N) and shall be as given in Table 1.

**TABLE 1 NUMBER OF CONTAINERS TO BE
SELECTED FOR SAMPLING**

LOT SIZE (N)	NO. OF CONTAINERS TO BE SELECTED (n)
Up to 50	3
51 „ 100	5
101 „ 300	8
301 and above	13

C-2.3 The containers shall be selected at random from the lot. In order to ensure the randomness of selection, procedures given in IS:4905-1968* may be followed.

C-3. PREPARATION OF TEST SAMPLES AND REFEREE SAMPLE

C-3.1 To ensure that the sample taken from each container is representative of the contents, the contents shall be mixed thoroughly by shaking or by stirring, or both.

C-3.2 After the contents are thoroughly mixed, a small representative portion of the material shall be taken with the help of a suitable sampling instrument from each of the containers selected. The total quantity of the material drawn from each container shall be sufficient to conduct tests for all requirements as specified in this standard.

*Methods for random sampling.

C-3.3 The material taken from each container shall be divided into three equal parts, each forming an individual sample. One set of the individual samples representing n containers selected shall be marked for the purchaser, another for the supplier and the third to be used as referee sample.

C-3.4 All the samples shall be transferred to separate containers. These containers shall then be sealed air-tight and labelled with full identification particulars as given in **C-1.4**.

C-3.5 The referee sample consisting of a set of r individual samples representing n containers selected shall bear the seals of both the purchaser and the supplier. It shall be kept at a place agreed to between the purchaser and the supplier and shall be used in case of any dispute between the two.

INDIAN STANDARDS

ON

ADHESIVES AND PRESSURE SENSITIVE ADHESIVE TAPES

IS:

- 425-1953 Shellac adhesives for steam flange joints
- 2249-1963 Adhesives (liquid) for leather beltings
- 2257-1970 Paper adhesives, liquid gum and office paste type (*first revision*)
- 2560-1979 Rubber-based adhesives for tubes, non-curing (*first revision*)
- 2561-1963 Rubber-based adhesives for the automobile industry
- 2562-1979 Rubber-based adhesives for tyres and tubes, curing (*first revision*)
- 2880-1978 Pressure sensitive adhesive cellulose tape (*first revision*)
- 2886-1964 Labelling paste for automatic machines
- 3116-1965 Sealing compound for lead acid batteries
- 3434-1965 Glossary of terms for adhesives and pressure sensitive adhesive tapes
- 3447-1965 Shellac jointing or gasket compound
- 3676-1978 Pressure sensitive adhesive PVC tapes
- 3687-1977 Pressure sensitive adhesive cloth tapes (*first revision*)
- 3988-1967 Guar gum
- 4185-1967 Adhesives paper tapes
- 4663-1968 Rubber-based adhesives, permanent, for footwear industry
- 5025-1976 Gum karaya (*first revision*)
- 6367-1971 Dextrin for adhesive industry
- 7393-1974 Adhesive, bitumen emulsion
- 7395-1974 Gum ghatti
- 7437-1974 Methods of sampling and test for vegetable adhesives
- 8230-1976 Steel-filled epoxy resin based adhesives
- 8402-1977 Methods of sampling and test for pressure sensitive adhesive tapes

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N = 1 kg. m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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